ADDENDUM F

WRITING LEARNING OBJECTIVES LESSON PLAN

Table-Top Training Design

INSTRUCTOR PREPARATION PAGE

Writing Learning Objectives

COURSE TITLE: Table-Top Training Design (5480.20A Training Seminar Series)

LESSON TITLE: Writing Learning Objectives

TIME REQUIRED: **25** Minutes

REFERENCES:

1. United States Department of Energy course Instructional Analysis and Design.
2. United States Department of Energy course On-the-Job Instructor Training.
3. United States Department of Energy Guideline, DOE-STD-1005-92, *Guide to Good Practices for Developing Learning Objectives*; July 1992.

OBJECTIVE:

Terminal: Given an example task and a method for writing learning objectives, CONSTRUCT a learning objective containing a condition, a performance statement, and a standard.

Enabling:

OBJECTIVES.1 -	Describe the three elements of a learning objective.
OBJECTIVES.2 -	Explain how enabling objectives support a terminal objective.
OBJECTIVES.3 -	State the four qualities of a good learning objective.
OBJECTIVES.4 -	Write several objectives using the template method.

INSTRUCTIONAL AIDS:

Objectives-P-1,	Terminal Objective
Objectives-P-2,	Enabling Objectives
Objectives-P-3,	Overview (Written on flipchart)
Objectives-O-1,	Definition of Learning Objective
Objectives-O-2,	Action Verbs

Table-Top Training Design

INSTRUCTOR PREPARATION PAGE

Writing Learning Objectives

Objectives-O-3,	Non-Action Verbs
Objectives-O-4,	Conditions
Objectives-O-5,	Standards
Objectives-O-6,	Levels of Learning Objectives
Objectives-O-7,	Qualities of Good Learning Objectives
Objectives-H-1,	List of Action Verbs
Objectives-H-2,	Templates of Action, Condition, and Standard Statements
Objectives-H-3,	Model Skills and Knowledge Statements

Flipchart stand and paper, (3) colors of flipchart markers.

PARTICIPANT PREPARATION: None.

INSTRUCTOR PREPARATION: Set up a flipchart stand with a pad of paper at the front of the room where everyone can see it. The facilitator will need at least 3 different colored felt-tipped markers in-hand. WRITE "Overview" on a flipchart sheet and hang up.

PRESENTATION METHOD: Lecture, short application exercises.

EVALUATION METHOD: Participation in TTTD Step 8, the development of course objectives for the training program in accordance with the guidelines provided.

NOTES TO INSTRUCTOR: This lesson introduces those who will be writing the learning objectives to the terms and processes involved in writing them. This lesson is designed to equip them with the knowledge and skill necessary to perform adequately during Step 8 of the TTTD Process. Step 8, "Write the Learning Objectives," requires those who will write the objectives to take the course content and develop terminal and enabling objectives.

Hang all posters on a wall other than the TTTD wall:

Table-Top Training Design

INSTRUCTOR PREPARATION PAGE

Writing Learning Objectives

POST TTTD Objectives-P-1, Terminal Objective, and leave displayed throughout the lesson.

POST TTTD Objectives-P-2, Enabling Objectives, and leave displayed throughout the lesson.

WRITE and POST Objectives-P-3, Overview, on a flipchart and leave displayed throughout the lesson.

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
I. INTRODUCTION	
A. Preliminaries	
1. Instructor's Name	ENSURE that your name is visible
2. Participant Materials	REFER participants to "Objectives" section.
3. Participant Comfort	ELIMINATE distractions
B. Motivator	WRITE on a flipchart or whiteboard the quotation: "If you aim for nothing, you're bound to hit it!"
1. Think about this statement for a few seconds...(pause). What planning concept does this statement address? (Identifying goals)	
2. You're not going to reach a goal if you don't identify it first. Once you identify it, <u>then</u> you can make plans to effectively reach it.	

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
3. The concept of goal setting has significant implications for the training process.	STATE: Imagine yourself as an instructor who is writing a lesson. ASK: What value would there be in setting goals for what you want your trainees to learn?
4. You can then develop your instructional material in a way that will most effectively reach that goal. 5. One of the most crucial steps in the design phase is setting goals for learning, or establishing what you want the trainees to have learned, once training is complete. 6. We call these goals "learning objectives."	STATE: This lesson will equip you to write learning objectives (Step 8).

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
C. Objectives	
Terminal: Given an example task and a method for writing learning objectives, CONSTRUCT a learning objective containing a condition, a performance statement, and a standard.	REFER to TTTD Objectives-P-1, Terminal Objectives. REFER participants to Workbook page 3.
Enabling:	REFER to TTTD Objectives-P-2, Enabling Objectives.
• Describe the three elements of a learning objective. • Explain how enabling objectives support a terminal objective. • State the four qualities of a good learning objective. • Write several objectives using the template method.	
D. Overview	REFER to TTTD Objectives-P-3, Overview.
1. The three elements of a learning objective. 2. The levels of a learning objective. 3. The four qualities of a good learning objective.	

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
4. Writing objectives using the template method.	
II. ELEMENTS OF LEARNING OBJECTIVES	ASK: Who can tell me what a learning objective is?
A. Definition	
1. A "learning objective" is (1) a statement that specifies a measurable behavior that a trainee should exhibit after instruction, (2) the conditions under which the behavior will be evaluated, and (3) the standards for performance.	SHOW: TTTD Objectives-O-1, Definition of Learning Objective. REFER participants to Workbook page 4. STATE: Notice that three elements make up objectives.

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

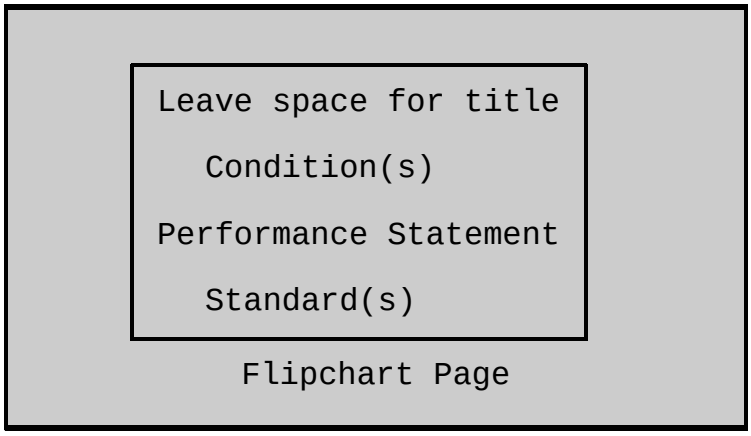
Discussion Points	Instructor / Trainee Activity
 Flipchart Page	WRITE on the flipchart (a different color for each word) "Performance Statement", "Condition(s)" and "Standard(s)". REFER participants to Workbook pages 5 and 6.
B. Performance Statement 1. A "performance statement" has an action verb and direct object.	STRESS: Importance of picking the action verb that **best** describes what you want the trainee to do. SHOW: TTTD Objectives-O-2, Action Verbs.

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
2. The action verb must be measurable. Action verbs like, "perform," "describe," "calculate," or "construct" have measurable ends and describe exactly what the trainee must do.	STRESS: It is very difficult, maybe impossible to measure whether someone "believes" or "understands" something.
3. Vague action verbs which cannot be measured include verbs like, "understand," "believe," or "recognize."	SHOW: TTTD Objectives-O-3, Non-Action Verbs.
APPLICATION: STATE: Suppose you work for a landscaping company and one of the duty areas is lawn care. One of the tasks is mowing lawns. Let's develop a learning objective for mowing a lawn. WRITE: "Mowing a Lawn" at the top of the flip chart page.	ASK: What would be a good performance statement for your learning objective? (mow a lawn)

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
WRITE: "mow a lawn" under "performance statement" on your flipchart.	
	ASK: Why wouldn't "understand how to mow a lawn" be a good performance statement?
STATE: "understand" is not measurable and does not describe exactly what you want the trainee to do. You want them to "mow the lawn", not just "know how to."	DISTRIBUTE Objectives-H-1, Action Verb List.
C. Conditions	SHOW: TTTD Objectives-O-4, Examples of Conditions.
1. The "condition" is the necessary circumstance under which the task will be performed.	REFER participants to Workbook page 7.
2. Good examples of condition statements include: • Given the necessary materials and equipment • Using test instruments	

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
• Given some simulated condition	POINT OUT that conditions can be based on the use of equipment or based on a situation.
APPLICATION:	STATE: Let's come up with a condition statement for our task "mow a lawn."
	ASK: Given the explanation of "conditions," what would be a good condition statement for mowing the lawn? (Given an XYZ lawn mower)
WRITE: "Given an XYZ lawn mower" under "conditions" on your flipchart.	
D. Standards	SHOW: TTTD Objectives-O-5, Examples of Standards.
1. The "standard" describes the acceptable performance, or how well the trainee must perform the task to be considered acceptable.	REFER participants to Workbook page 8.

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
	STATE: Notice the different ways these standards have been written.
2. Standard could describe: ● how the trainee should perform a task, such as: "within 30 minutes," or "performing all steps in sequence." ● how the finished product should turn out, such as: "according to manufacturer's specs," "according to procedure XYZ," or "with 100% accuracy."	
APPLICATION:	STATE: Let's come up with a standard statement for our task "mow a lawn." ASK: Given the explanation of "standards," what would be a good standard statement for mowing the lawn? (missing no spots, or in a criss-cross pattern)

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
WRITE: "in a criss-cross pattern" under "standards" on your flipchart.	
READ the entire learning objective to the class ("given an XYZ lawn mower, mow the lawn in a criss-cross pattern").	ASK: What are the 3 parts of a learning objective? (performance, condition and standard statements)
Transition: Now that you know the 3 parts of learning objectives, let's look at the different levels of objectives.	
III. LEVELS OF LEARNING OBJECTIVES	STATE: There are two levels of learning objectives. ASK: Can someone tell me what they are? (terminal and enabling)
A. Terminal Objectives	SHOW: TTTD Objectives-O-6, Levels of Learning Objectives.
1. The terminal objective is the end result intended for instruction. 2. Terminal objectives are directly tied to the tasks in a training lesson.	REFER participants to Workbook page 9.

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
	ASK: What, then, are enabling objectives?
B. Enabling Objectives	
1. Enabling objectives are detailed statements of the elements, or knowledge and skills.	
2. These objectives must be met in order to meet the terminal objective.	
	POINT OUT that the enablers must be met before the trainee can accomplish the terminal objective of "mow the lawn."
a. In other words, enablers are "steps" toward achieving the terminal objective.	
b. The order of the steps is logical. For example, safety considerations probably should be taught before any operation of the mower takes place.	
c. Also, the knowledge "builds" on previous knowledge as the lesson progresses.	POINT OUT that enabling objectives normally consist of performance statements only.

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
d. When the conditions and standards of the Enabling Objectives are the same as the Terminal Objective, they are normally implied (not written). If they are different, they must be written.	
Transition: We now know what objectives are. Let's find out what qualities make objectives "good."	
IV. QUALITIES OF GOOD LEARNING OBJECTIVES	SHOW: TTTD Objectives-O-7, Qualities of Good Learning Objectives. REFER participants to Workbook page 10. STATE: Good learning objectives have 4 qualities.
A. Specific Concisely worded? No unnecessary verbiage?	TELL the participants to note the questions they can ask to evaluate quality.

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
B. Clear If you presented the objective to several persons, would they all interpret it in the same way?	
C. Attainable (realistic) Can the average trainee achieve the objective?	
D. Measurable	
1. Can I measure the behavior required by the objective?	ASK: What are some verbs that are hard to measure?
2. "Belief" or "understanding" are hard to measure.	REFER to flipchart with the learning objective the class worked on earlier. ASK: How does the learning objective we came up with earlier compare against these "(4) qualities of good objectives."

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
	ASK: Is this objective in the form of an enabling objective or a terminal objective? (Terminal)
EXERCISE: Lead the class through the writing of a terminal objective based on the TTTD content. DO NOT provide any of your own input during this process, but write the results on a flipchart. When complete, ask the participants to evaluate the terminal objective against the criteria for good learning objectives. Transition: You have just learned one way to write learning objectives. There is an alternative method which we will now examine.	
V. WRITING OBJECTIVES USING THE TEMPLATE METHOD	
A. What is a template? A template is a pattern or model that one follows.	**NOTE: If the template method will not be used by the participants during the process, skip Section V and go to Section VI, "APPLICATION."**

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
Illustration Suppose you have to make 100 rocking horses in 2 weeks. The horses will be identical in every way. You have the wood and all the tools you need. Suggest the answer below if needed: Create patterns of the various parts of the horse and trace them onto the wood to cut out. Then you won't have to start all over again with figuring the dimensions once you finish the first horse. The dimensions already exist in your template. Templates can be used for writing learning objectives as well. In the same way the dimensions were already established by the template for the rocking horse so they did not have to be re-figured for the next horse, dimensions can be established in the form of action verbs, conditions and standards in learning objectives. The action verbs, standards, and conditions are established in the form of a template beforehand and the job-specific information is added.	ASK: How would you approach making these horses in the quickest way? (USE Sewing 100 identical shirts" if more appropriate to the audience.

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
B. Examples of templates	
1. Let's look at some examples of templates for various job functions.	
2. The template approach is based on the premise that technical training has common objectives that apply across many areas.	
3. For example, workers who operate or maintain facility systems would be expected to meet the objectives on workbook page 11.	REFER participants to Workbook page 11.
4. Templates also can be established for conditions and standards statements as well.	
	DISTRIBUTE Objectives-H-2 pages 1 through 8 and Objectives-H-3. POINT OUT the example conditions, action, and standard statements.
	ASK: Can anyone see a weakness in using templates?

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
C. Cautions for using templates 1. While templates can simplify the development of learning objectives, we need to recognize that ***most*** training situations will also require the development of some unique learning objectives. 2. Therefore, AVOID the assumption that your template objectives are addressing ***all*** the knowledge and skills the trainee needs to do the job.	
EXERCISE Lead the class through the writing of a terminal objective based on the TTTD content and using the template method. Direct the participant's attentention to content that would benefit from the template method. DO NOT provide any of your own input during this process (except guidance in using templates), but write their results on a flipchart.	POINT OUT content to the team. ASK: How would you apply the template method with this content?

Table-Top Training Design

INSTRUCTOR PAGE

Writing Learning Objectives

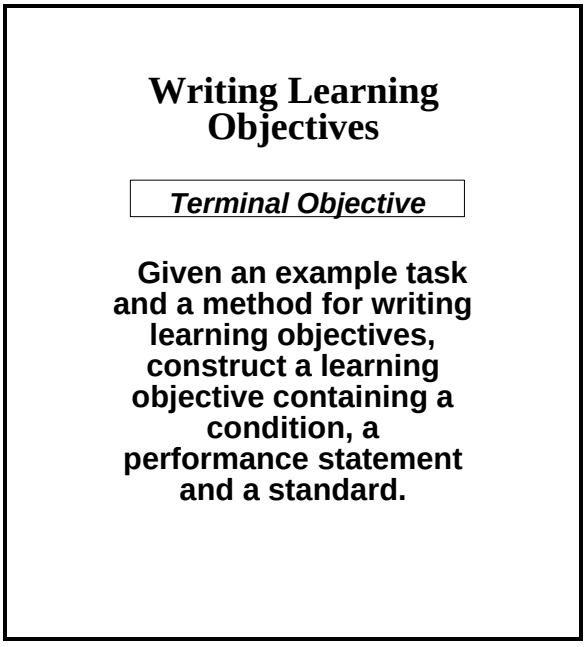
Discussion Points	Instructor / Trainee Activity
VI. SUMMARY	
	ASK: Why should we establish learning objectives?
A. Learning objectives assist us in gearing our materials to meet those objectives.	
	ASK: What are the 3 elements of learning objectives?
B. Condition, performance and standard statements.	
	ASK: What are the 4 qualities of good learning objectives?
C. Specific, clear, attainable, measurable (SCAM).	
	ASK: Describe the relationship between the terminal and enabling objectives.
D. The enabling objectives are "steps" to attaining the terminal objective.	

Table-Top Training Design

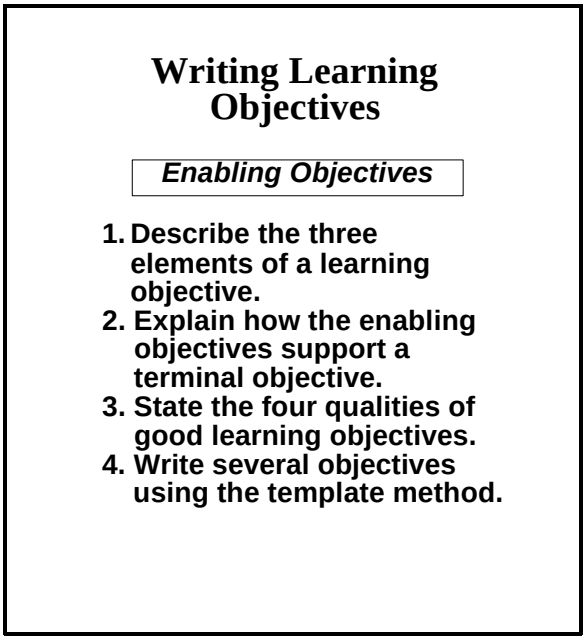
INSTRUCTOR PAGE

Writing Learning Objectives

Discussion Points	Instructor / Trainee Activity
	ASK: What caution would you give to someone using the template method for writing learning objectives?
E. Avoid the assumption that template objectives are addressing ***all*** the knowledge and skills a trainee needs to perform a task.	
VII. APPLICATION	TELL participants they will find the action verb list and the other handouts useful as they write objectives during Step 8.
A. Step 8 Now that you have completed this lesson, let's move into TTTD Step 8 and write the learning objectives for the content we have identified.	



TTTD OBJECTIVE-P-1



TTTD OBJECTIVE-P-2

Overview

- The three elements of learning objectives
- The levels of learning objectives
- The four qualities of good learning objectives
- Writing objectives using the template method

Learning Objectives consist of:

1. A statement that specifies a measurable behavior
2. The conditions under which the behavior will be evaluated
3. The standards for performance

TTTD OBJECTIVE-O-1

Action Verbs

Calculate	Define	Describe
List	Recite	Assemble
Construct	Underline	Demonstrate
Indentify	Select	Perform
Solve	Operate	Saw
Fasten	Drill	Paint

TTTD OBJECTIVE-O-2

Non-Action Verbs

Believe	Realize	Hear
Perceive	Feel	See
Think	Recognize	Memorize
Know	Understand	Appreciate

TTTD OBJECTIVE-O-3

Examples of Conditions

Equipment:

- Given the necessary tools
- Using test instruments
- Using a manual, specs., etc.

Situations:

- Given a work order, verbal instructions, blueprint, etc.
- Provided with results of a diagnostic test
- Under some simulated condition

TTTD OBJECTIVE-O-4

Examples of Conditions

Equipment:

- **Given the necessary tools**
- **Using test instruments**
- **Using a manual, specs., etc.**

Situations:

- **Given a work order, verbal instructions, blueprint, etc.**
- **Provided with results of a diagnostic test**
- **Under some simulated condition**

TTTD OBJECTIVE-O-5

Levels of Learning Objectives

Terminal: End result intended for instruction

Enabling: Supporting steps toward obtainment of terminal objective

T. O.
Mow a lawn

E. O.
State safety considerations

E. O.
Prepare the lawn for mowing

E. O.
Prepare the lawn mower for operation

E. O.
Demonstrate the (3) mowing patterns

TTTD OBJECTIVE-O-6

Learning Objectives

Qualities:

- **Specific**
- **Clear**
- **Obtainable**
- **Measurable**

TTTD OBJECTIVES-H-1

ACTION VERB LIST

Acknowledge	To recognize and respond to an indication of alarm.
Actuate	To put into mechanical action or motion.
Adjust	To bring a continuous effort into proper or exact position.
Align	To adjust or correct relative position of an item.
Alternate	To change or substitute one to another.
Analyze	To break down a complex whole into its component parts.
Announce	To give notice of an event or evolution via the public address system.
Answer	To respond to a request for information.
Anticipate	To give advance thought, discussion or treatment; to foresee.
Apply	To bring into action; to put into operation.
Assemble	To fit together parts into a complete structure or unit.
Assess	To determine the importance, size, or value.
Assist	To give support or aid.
Authorize	To legally approve an action; to empower.
Backwash	To move air or water backward by a propelling force.
Balance	To equalize opposing forces.
Begin	To commence or initiate.

TTTD OBJECTIVES-H-1

Bleed	To extract or cause to escape from a contained source.
Block	To obstruct passage or progress.
Boil	To heat to the boiling point.
Borate	To add boric acid.
Build	To construct according to a specific plan or process.
Bypass	To avoid or circumvent.
Calculate	To determine by mathematical processes.
Calibrate	To detect, correlate, report, or eliminate by adjustment and discrepancy in accuracy of an instrument or measuring device being compared with the national standard.
Call	To communicate orally in person or by phone.
Center	To place or adjust around a center area or position.
Change	To replace.
Charge	To restore or load to capacity.
Check	To look at carefully or critically; to verify.
Choose	To select after consideration of alternatives.
Circulate	To flow in a circular path.
Clean	To free from dirt or contamination.
Clear	To free from obstruction or limitation.
Close	To bring or come to a natural or proper end; to cease operation.

TTTD OBJECTIVES-H-1

Code	To assign symbols or signals (i.e., letters, numbers, words).
Collect	To bring together into one body or place.
Compare	To examine the character or qualities in order to discover resemblances or differences.
Complete	To bring to an end; having all necessary parts.
Compute	To determine by mathematical means.
Connect	To join or fasten together.
Control	To manage with authority.
Cool	To cause to lose heat or warmth.
Correct	To alter or adjust to a required condition or standard.
Construct	To make or form by combining parts.
Decide	To come to a conclusion based on available information.
Decrease	To make less (as in size, number, or intensity).
Deenergize	To disconnect energy or voltage.
Depress	To press down.
Deselect	To stop a selected function.
Detect	To discover the existence or presence of something.
Determine	To decide or resolve conclusively.
Diagnose	To recognize or determine the nature or cause of a condition by consideration of signs or symptoms.

TTTD OBJECTIVES-H-1

Dilute	To make thinner, or diminish the strength of by admixture.
Direct	To assign activities to another person.
Disassemble	To take apart.
Disconnect	To sever or terminate a connection.
Display	To exhibit for visual evidence.
Dispose	To get rid of.
Dissolve	To cause to pass into solution.
Don	To put on clothing or equipment.
Energize	To impart energy or voltage.
Enter	To input data.
Establish	To make firm or stable.
Estimate	To appraise or establish value based on judgment or opinion.
Exit	To go out or go away.
Explain	To make understandable.
Feed	To supply a signal to an electric circuit.
Flush	To clean or wash out with a fluid.
Heat	To add energy to supply higher temperature.
Hoist	To raise into position using a tackle.
Hold	To retain by force; to apply continuous pressure.

TTTD OBJECTIVES-H-1

Identify	To regard or recognize clearly.
Immerse	To plunge or dip into a fluid.
Increase	To add or enlarge in size, extent, quantity.
Inform	To communicate information.
Inspect	To examine officially; to determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards.
Install	To seat, or fix into position a component or assembly to allow the proper functioning of equipment or system.
Interpolate	To determine or estimate intermediate values from two given values.
Interpret	To translate the meaning of.
Insert	To put in.
Isolate	To separate from another.
Jog	To move; start and then stop quickly.
Letdown	To descend.
Lineup	To organize in a linear or sequential arrangement.
Load	To place power output on line.
Locate	To find a particular spot or place.
Lock	To secure by key or combination; to restrict the action of by fastening.
Log	To record required information in a book.

TTTD OBJECTIVES-H-1

Lower	To decrease in elevation.
Lubricate	To make smooth or slippery by applying a substance capable of reducing friction.
Maintain	To keep in an existing state.
Manipulate	To operate mechanically or with skillful hands.
Measure	To regulate by a standard.
Mix	To combine or blend.
Monitor	To check or observe the operation of a system and its components over a period of time.
Move	To go or pass from one place to another with continuous motion.
Multiple	To increase in number greatly or in multiples.
Neutralize	To counteract the activity or effect; to make electrically inert.
Notify	To give formal notice to.
Observe	To watch with careful attention.
Obtain	To hold on to; to gain by planned action.
Open	To make available for entry or activity.
Operate	To start, stop, or influence the operation of a specified component or system.
Organize	To arrange into a coherent unit or function.
Overhaul	To restore to a completely serviceable or operational condition as prescribed by maintenance standards.

TTTD OBJECTIVES-H-1

Override	To bypass the action of an automatic control.
Perform	To carry out an action, to conform to a prescribed procedure.
Plan	To devise or formulate a program of future or contingency activity.
Plot	To represent by means of a curve constructed by placing points on a graph.
Position	To place a control in a discrete state.
Prepare	To get an item ready for delivery or operation.
Pressurize	To apply force in a contained vessel.
Prime	To prepare for work by filling or charging with something.
Print	To produce something in printed form.
Pull	To draw out or hold back.
Pump	To raise, lower, transfer, or compress fluid or gasses by suction or pressure or both.
Push	To force away.
Purge	To free of sediment or relieve of trapped air by bleeding.
Rack In/Out	To insert or remove the breaker from the cabinet.
Raise	To increase in elevation.
Reactivate	To cause to become active or functioning again.
Read	To understand visual information which is presented symbolically by scanning.

TTTD OBJECTIVES-H-1

Realize	To bring into existence.
Rebuild	To restore unserviceable equipment to a like-new condition in accordance with original manufacturing standards.
Receive	To be given written or verbal information.
Recirculate	To begin flow again.
Record	To write information or document events or trends.
Release	To set free.
Remember	To retain information or to recall information.
Remove	To take away.
Repair	To restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in component or assembly.
Replace	To substitute serviceable component or assembly for an unserviceable counterpart.
Report	To give an account of; a formal document of proceedings of a meeting.
Request	To ask for information.
Respond	To react in response; to answer.
Return	The act of restoring something to a former state or condition.
Rinse	To clean by flushing with liquid.
Run	To continue in force or operation.
Sample	To draw a specimen for judging the quality of the whole.

TTTD OBJECTIVES-H-1

Scan	To read hastily.
Secure	To protect from damage; to control access.
Select	To choose from a group.
Sequence	To arrange in order.
Service	To keep an item in proper operating condition.
Shut	To stop or suspend operation (see close).
Shutdown	To stop or suspend operation (see close).
Sketch	To draw roughly.
Spray	To apply a jet of vapor or mist.
Start	To begin to set in operation.
Start Up	To start.
Stop	To close or cease (see close).
Store	To lay away for future use.
Stow	To store.
Switch	To shift to another electrical circuit; to exchange.
Subtract	To take away by reducing.
Supply	To provide or furnish.
Synchronize	To arrange operations to occur simultaneously.
Telephone	To communicate by phone.

TTTD OBJECTIVES-H-1

Test	To verify serviceability and detect failure by measuring against prescribed standards.
Throttle	To decrease the flow of; to regulate the speed of.
Titrate	To determine the strength of a solution or the concentration of a substance in solution in terms of the smallest amount of a reagent of known concentration required to bring about a given effect in reaction with a known volume of a test solution.
Total	To add up; to compute.
Trace	To discover signs, evidence, or remains of.
Track	To be aware of a progression of activities.
Transfer	To convey from one place or situation to another.
Transmit	To send or transfer from one person to another.
Transport	To transfer or convey from one place to another by mechanical means.
Trip	To remove from service rapidly.
Tune	To adjust to respond to radio waves of a particular frequency.
Turn	To rotate or revolve.
Type	To operate a keyboard.
Unlatch	To open or loosen by lifting a latch.
Unload	To take off.
Upgrade	To raise the quality of; to improve.
Update	To bring up to date; to revise.

TTTD OBJECTIVES-H-1

Unlock	To unfasten; to free from restraint.
Uncouple	To detach or disconnect.
Vent	To release gas, liquid, or pressure.
Verify	To confirm the accuracy of.
Ventilate	To expose to air.
Wait	To expect or remain in readiness.
Warm	To make ready for operation by preliminary exercise or operation.
Weigh	To ascertain the heaviness of.
Withdraw	To remove from use.
Zero	To adjust to zero.

TTTD OBJECTIVES-H-2

EXAMPLE CONDITIONS STATEMENTS

The following phrases illustrate several types of condition statements. They are a sample of many different possible combinations and include plant, job, information, and qualitative examples. Fill-in-the-blank spaces are included in statements that can be used in a variety of applications.

Facility

- During normal conditions,
- During facility mode ___,
- Given a ___ transient,
- Given a change in ___,
- Given ___ failure(s),
- Given immediate action conditions,
- Given entry-level conditions to technical specifications/operational safety requirements,
- Given entry-level conditions to abnormal (or emergency) procedures,
- Under all conditions,

Job

- During shift turnover,
- While performing facility rounds,
- While standing the ___ shift,
- While making ___ log entries,

TTTD OBJECTIVES-H-2

- While alone in the ___,
- Prior to conducting ___,
- Given an unlabeled ___,
- Using the ___ (tools, equipment, etc.),

Information

- Using ___ procedures/references,
- Using available indicators,
- Using alternative indicators,
- Using ___ survey results,
- Using ___ surveillance test results,
- Upon receiving ___ annunciators/alarms,
- Given abnormal ___ indications,
- Given any abnormal indications,

Qualitative

- Upon request,
- From memory,
- Through observation,
- Using only sound,
- From smell alone,

TTTD OBJECTIVES-H-2

- From touch alone,
- Upon direction,
- Without prompting,

EXAMPLE ACTION STATEMENTS

Example action statements are provided in the affective,cognitive, and psychomotor performance areas. Each set of examples uses a series of fill-in-the-blank statements arranged from higher to lower levels of performance. They are a sample of many possible combinations.

AFFECTIVE

- prevent ___
- exhibit ___

COGNITIVE

Purpose

- state the purpose of the ___ system

Safety Precautions

- encourage others to carry out the following safety precautions:
- predict the damage that each of the following can cause:
- list the precautions associated with the ___ system
- identify the personnel hazards or dangers associated with the system

TTTD OBJECTIVES-H-2

Design and interrelationships

- predict the ___ system response during a ___ transient:
- predict the effects of a loss or malfunction of___ on ___
- explain the purpose of each of the following ___ system interlocks:
- identify normal and alternate ___ power supplies to the following:
- describe the functional dependencies that exist between the ___ and ___ systems
- match the following ___ system parameters to facility modes:
- locate the components of the ___ system
- draw a one-line diagram of the system that shows its key components and physical connections with other systems
- name the major components of the ___ system
- state the design basis of the ___ system

Procedures

- report errors in ___ procedures
- use procedure ___ to ___
- describe the process for reporting errors or sources of confusion in ___ procedures
- list the consequences of improperly performing a ___
- select the procedure(s) for the ___ activity

TTTD OBJECTIVES-H-2

Controls

- evaluate the loss of ___ control to determine alternative means for regaining control
- evaluate how the ___ control layout, design, and operation limitations might contribute to human performance error
- identify any peculiar features of ___ that might contribute to humanerror
- relate ___ control adjustments to their effects on the following system parameters:
- identify where the ___ system controls are located

Alarms

- verify a ___ alarm
- identify the ___ alarms expected during the following facility activities:
- recognize the setpoints of the ___ alarms
- locate the ___ alarm annunciator
- identify where the following ___ alarm sensors monitor the system:
- identify the alarms associated with the ___

Indicators

- detect ____ trends displayed by the ____ recorder
- recognize the failure modes of each of the ____ following monitors:
- match ____ indications to specific facility conditions
- obtain information from the ____ recorder

TTTD OBJECTIVES-H-2

- locate where in the flow path each of the following indicators senses ____ system parameters:
- identify the monitors associated with the ____ system

Sampling

- evaluate the need for an additional ____ sample
- record the parameters of a ____ sample
- list the factors that can influence ____ analysis results
- identify the labeling information required on ____ samples
- determine the flushing/recirculation requirements for sampling the ___
- identify the sample points in the ___

Teamwork

- critique individual and team performance
- manage conflict through collaboration
- exhibit initiative and leadership
- provide complete input and feedback
- advocate a position or concern
- inquire to obtain needed information

Operations

- avert a problem in the ___

TTTD OBJECTIVES-H-2

- mitigate the effects of a ___ on the ___
- evaluate the system response during a ___ event
- evaluate operating limitations of the ___ system
- detect ___ performance errors
- detect abnormal conditions
- detect changes in ___
- monitor the ___
- determine an alternative explanation of ___ conditions
- interpret the following conditions:
- use alternative indicators to confirm ___ conditions
- identify the symptoms associated with ___
- identify abnormal characteristics

PSYCHOMOTOR

- (any task or element statement is a possible psychomotor action statement)
- practice ___
- observe ___

TTTD OBJECTIVES-H-2

EXAMPLE STANDARDS STATEMENTS

The following statements suggest the type of phrases that can identify the performance criteria that trainees must fulfill to meet learning objectives. This is not an exhaustive list. It simply depicts some alternatives. Quantitative, procedural, and qualitative examples are provided. Fill-in-the-blank spaces are included in statements that can be used in a variety of applications. Designers (or developers) are encouraged to use statements that closely approximate actual performance criteria.

QUANTITATIVE

- with less than ___ errors
- to + ___
- within ___ seconds/minutes/hours
- without producing more than ___ units of waste
- without receiving more than ___ mrems

PROCEDURAL

- predict how changing environmental conditions affect the ___ system
- predict the consequences of___ component failure on the ___ system
- explain the bases for limiting conditions of operations and safety limits of the ___
- match facility events to the notification requirements of outside agencies
- relate ___ system status to the notification requirements of facility personnel
- relate individual performance responsibilities to each mode of facilityoperation
- place the ___ in a safe condition

TTTD OBJECTIVES-H-2

- classify the following ___ system conditions into normal or abnormal:
- relate each ___ system test to the parameters it monitors
- select the applicable technical specifications/operational safety requirements for each of the following facility conditions:
- identify the correct ___ system alignments for each of the following conditions:
- determine the ___ alignment for ___
- state the reason for ___
- describe the normal operation of the ___ system

Diagnostics

- evaluate the effects of ___ corrective actions
- implement corrective actions
- evaluate alternatives
- assess the safety implications of each of the following recovery alternatives
- determine the urgency of a ___ condition
- evaluate the potential for ___ to worsen
- predict the effects of ___ on other facility systems
- relate changes in to ___ the need for action
- in accordance with ALARA policy
- in accordance with the RWP

TTTD OBJECTIVES-H-2

- in accordance with all certification criteria
- in accordance with applicable labor agreements
- in accordance with steps ___ through ___ of the emergency plan
- in accordance with steps ___ through ___ of procedure number ___

QUALITATIVE

- without error
- without spillage
- without breakage
- without loss of material
- without hesitation
- with absolute clarity
- on schedule
- on the first attempt
- before proceeding
- to minimize time and optimize distance and shielding
- to the accuracy of the instrument
- before conditions degrade
- prior to equipment damage
- prior to performing subsequent actions

TTTD OBJECTIVES-H-2

- without entering a limiting condition of operation
- while remaining within technical specifications/operational safety requirements

TTTD OBJECTIVES-H-3

MODEL SKILLS & KNOWLEDGE STATEMENTS WORKSHEET

1. [SYSTEM] or [SUBSYSTEM] or [EQUIPMENT] Knowledge

1-1 GENERAL

1-1-1 State the purpose(s) of the _____.

a.

b.

-OR-

State that the purpose of the _____is to_____.

1-1-X State that the _____ consists of the following: Include the function of each.

a.

b.

-OR-

State the relationship, including function, of each _____ to each _____ and the following equipment:

a.

b.

TTTD OBJECTIVES-H-3

1-1-X Define the abbreviations, terms and symbols used with the _____(for example, _____,_____, and_____).

1-1-X State the operational characteristics and capabilities of the _____.

a. [Power, logic levels, capacity, emergency, tolerance, and accuracies when applicable]

1-1-X Describe the differences between _____. [Models]

1-1-X State the security requirements for the _____.

1-2 PHYSICAL DESCRIPTION

1-2-1 Describe all major and associated components of the _____. Include name, quantity required, physical appearance, reference designator, location and construction features.

a.

b.

1-2-X Describe displays, controls and indicators directly associated with the _____. Include name, reference designators, positions, colors and location.

a.

b.

TTTD OBJECTIVES-H-3

1-3 FUNCTIONAL DESCRIPTION

1-3-1 Describe the functional operation of the _____[in conjunction with the _____]. Include control, logic, signal flow, sequential operation and indications.

a. [list major components, subassemblies, and/or functional areas]

1-3-X Describe the functional operation of the loops within the_____. Include fuse words or phrases from above or new ones as appropriate].

1-3-X Describe the functions of each control and indicator required to operate and maintain the _____ in each position, condition and color.

1-3-X Describe each program used with the _____. Include name, purpose, program numbers, and assumptions and restraints imposed by the program.

a. [indicate programs, subprograms, routines, commands, instructions, codes, options, etc.]

1-4 INTERFACE DESCRIPTION

1-4-1 Describe the physical interface(s) between the _____ and the remainder of the _____ system(s).

-OR-

Describe the physical interface between the _____ and related external equipment.

-OR-

TTTD OBJECTIVES-H-3

Describe the physical interface between the _____ and the following associated systems/equipment: Include applicable electrical, hydraulic, mechanical or pneumatic interfaces.

a.

b.

1-4-X Describe the functional interface(s) between the _____ and the remainder of the _____ system.

-OR-

Describe the functional interface(s) between the _____ and related external equipment.

-AND-

a. Power sources

b. Input signals (types, format and sources)

c. Output signals (types, format and destinations)

d. Pneumatics

e. Hydraulics

1-5 OPERATIONAL DESCRIPTION

1-5-1 Describe the authority and regulations pertaining to the operation of the _____, including external equipment tie-in.

TTTD OBJECTIVES-H-3

1-5-X Describe the operational tasks to perform:

a. Pre-operations

1) [list pre-operational tasks]

b. Operations (Normal/Typical)

c. Post-operational tasks

1-5-X Describe the indications which should or may occur during operation of the _____. Include alarms, indicators, displays, readouts and printouts/typeouts.

1-5-X Describe data reduction techniques and associated log requirements. Include method, materials required and calculations performed (including results).

-OR-

Describe data logging requirements for the _____ . Include method and type of data logged and disposition.

1-5-X Describe [casualty] [abnormal] [degraded] [emergency] mode(s) of operation of the _____.

1-5-X Describe personnel and equipment safety precautions which are to be observed during operation.

1-6 MAINTENANCE DESCRIPTION

1-6-1 Define the maintenance policy for:

a. Preventive Maintenance - the requirement for periodic performance of tasks to minimize equipment malfunctions.

1) Servicing

   a) Cleaning
   b) Inspection
   c) Lubrication
   d) Painting/Preservation

2) Operational checks

   a) Pre-maintenance procedures
   b) Performance checks
   c) Degradation/deterioration checks

3) Progressive maintenance [surveillance] (if applicable - periodic refurbishment of components or assemblies in order to maintain levels of performance and reliability.)

b. Corrective Maintenance - checks and procedures used to locate and correct malfunctions.

   1) Authorized repair responsibility - correction of malfunctions to the authorized maintenance level.

   2) Fault isolation - location of faults to the level of available spares and authorized repair level.

      a) Equipment operational checks and tests

      b) Fault isolation tests and procedures

   3) Analytical procedures - isolation of faults, using authorized techniques not contained in prescribed maintenance documentation.

   4) Post maintenance procedures - procedures performed after repair. (Includes surveillance)

TTTD OBJECTIVES-H-3

1-6-X Describe the use of special tools and test equipment required for maintenance of the _____ as prescribed in applicable documentation.

1-6-X Describe preventive maintenance (tickler card) procedures for the_____. Include recognition and interpretation of all indications; and records, reports and instructions.

1-6-X Describe alignment, adjustment and calibration procedures for the _____.

1-6-X Describe operational tests for maintenance of the_____. Include name, use and procedures.

1-6-X Describe the recognition and interpretation of all malfunction indications for the _____.

1-6-X Describe systematic fault isolation procedures contained in prescribed maintenance documentation for the _____.

1-6-X Describe procedures to disassemble, repair, and reassemble the _____to the authorized maintenance level.

1-6-X Describe post-repair procedures for the _____.

1-6-X Describe personnel and equipment safety precautions which are to be observed when performing maintenance of the _____.

1-7 DOCUMENTATION

1-7-1 Describe the organization, content and use of all technical documentation provided for use with the _____.

a. [technical manuals, prints, tickler cards, manufacturer's literature, operation/maintenance/ surveillance procedures, etc.]

TTTD OBJECTIVES-H-3

2. [SYSTEM] or [SUBSYSTEM] or [EQUIPMENT] skills

2-1 OPERATION

2-1-1 Perform tasks for operation of the _____.

[May breakdown as:
Pre-operational procedures
Operational procedures
Post-operational procedures]

(Also, may make separate item callouts for each, providing a separate item callout is made in section 1-5)

2-1-X [Only if absolutely needed, otherwise considered to be part of 2-1-1 above]

Recognize and interpret all indications occurring during the performance of the operating procedures and perform the appropriate operator actions in the proper sequence, including _____for the _____.

2-1-X Comply with personnel and equipment safety precautions during operation of the _____.

2-2 MAINTENANCE

2-2-1 Use special tools and test equipment required for maintenance of the_____, as prescribed in applicable documentation.

2-2-X Perform preventive maintenance (tickler card) procedures on the _____ as scheduled by [PMS].

2-2-X Perform alignment, adjustment and calibration procedures on the_____.

TTTD OBJECTIVES-H-3

2-2-X Perform operational tests (and diagnostic programs) for maintenance of the _____.

2-2-X Recognize and interpret malfunctions of the _____.

2-2-X Perform fault isolation procedures on the _____as prescribed by [maintenance documentation].

2-2-X Use authorized techniques to isolate faults in the _____ which cannot be located using procedures contained in prescribed maintenance documentation.

2-2-X Disassemble, repair and reassemble the _____ to the authorized maintenance level.

2-2-X Perform post-repair procedures for the _____.

2-3 ASSEMBLY

2-3-1 Unpack and visually inspect (each/the) _____ for shipping and handling damage.

2-3-X Assemble (each/the) _____ in accordance with applicable procedures.

2-3-X Perform post-assembly procedures for the _____.